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Shoichi KAWANO* & Sadamoto WATANABE**: Some additional notes on the taxonomy of *Angelica acutiloba* subsp. *lineariloba* in Hokkaido

河野昭一*・渡辺定元**: ホソバトウキとその類縁

Angelica stenoloba was regarded by Kitagawa (1937) as a distinct species of the genus *Angelica*, and this viewpoint has been supported by some others (Ohwi, 1953; Hara, 1954; Hiroe & Constance, 1958; Kitagawa, 1960). However, after the discovery of many transitional forms between *A. acutiloba* var. *iwatensis* from the Hidaka mountain range, which are not considered to have been produced by hybridization between two species, i.e., *A. stenoloba* and *A. acutiloba*, it became necessary to redefine the limit of these taxa. Since our conclusion reached in the present study was the same as that of Kitamura (in Kitamura & Murata, 1962), some additional data supporting his current nomenclatorial proposal are

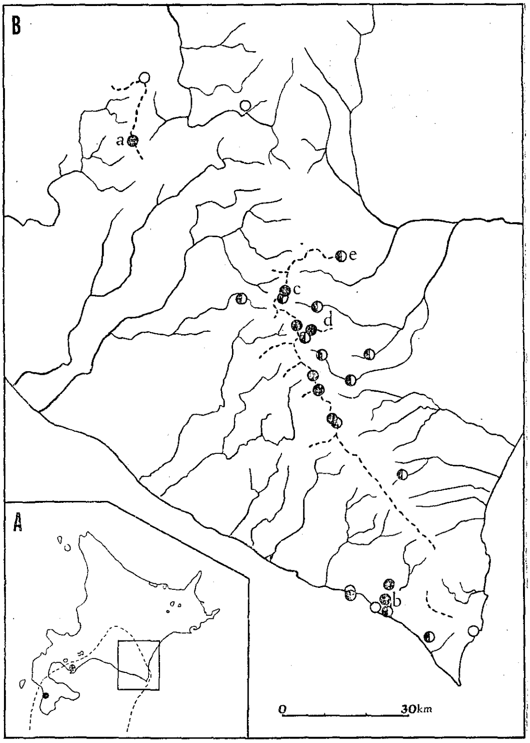

Fig. 1. A. Map showing the approximate distribution area of *Angelica acutiloba* s. lat. in Hokkaido. B. Map showing the distribution of *Angelica acutiloba* v. *iwatensis* (open circle), *A. acutiloba* ssp. *lineariloba* f. *lineariloba* (filled circle), and f. *lanceolata* (left half-filled circle) in the Hidaka Range and its adjacent areas. a. Mt. Yubari (type locality of *A. acutiloba* ssp. *lineariloba*); b. Mt. Apoi; c. Mt. Tottabetsu; d. Prikapetan, Tottabetsu R.; e. Mt. Tsurugi (cf. Tab. 1.).

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presented in this paper.

The main diagnostic characters employed for classifying these plants mentioned above are the leaf-shape and fruit size, only (cf. key to infraspecific taxa). Certainly, both extremes look very distinct, but as is shown in the map (Fig. 1), interconnecting forms, named *A. stenoloba* f. *lanceolata*, are so frequently found, particulary in the Hidaka mountain range, and they are sometimes indistinguishable by the leaf-shape from *A. acutiloba* var. *iwatensis* occurring in other localites of Hokkaido.

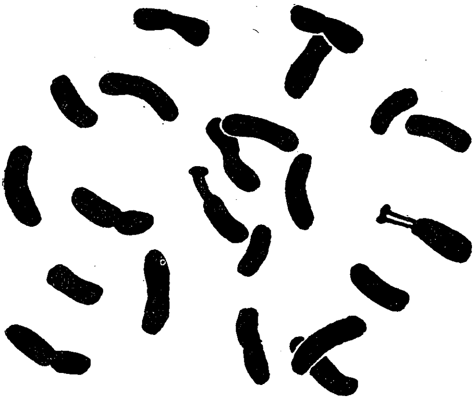

Fig. 2. Somatic chromosomes of *Angelica acutiloba* subsp. *lineariloba* (2n=22) from Mt. Apoi, Hidaka, Hokkaido (×2000). The preparation was made by following the Tjio & Levan's (1955) hydroxyquinoline-aceto-orceinsquash method.

It is interesting to note that subsp. *lineariloba*, which has linear ultimate leaf-lobes, ca. 3 mm broad, with distinctly dentate margin, is confined to the areas where the naked gravel barrens of peridotite and serpentine are met with, and interconnecting forms are mainly found in somewhat wet grassy or cliffy sites of the subalpine zone or lowlands. Thus, these populations are more or less isolated from each other ecologically. It should be also noted that there is a certain variation in the fruit size of the two subspecies, i.e., in subsp. *lineariloba*, the variation in the length of the fruit ranges from 3 to 5 mm and in width from 2 to 2.5 mm; whereas subsp. *acutiloba* var. *iwatensis* in Hokkaido has slightly larger fruits, 4–6 (rarely 6.5) mm long, and 1.2–2.0 mm wide.

The pollen fertility of subsp. *lineariloba* was quite normal except for a sample from Mt. Tottabetsu of the Hidaka Range (Table 1; cf. Ikuse, p. 112, pl. 66-181 & 182, 1956).

Chromosome number of *A, acutiloba* var. *iwatensis* is unknown at present, but material of subsp. *lineariloba* which was collected from Mt. Apoi, Prov. Hidaka, proved to possess 2n=22 chromosomes (Fig. 2). This diploid number is typical of all species so far studied of the genus *Angelica* (cf. Darlington & Wylie, 1955; Löve & Löve, 1961, etc.).

Tab. 1. Pollen size* and fertility.

Localities	length in μ	Mean	Width in μ	Mean	Ferti-lity %	No. of pollen grains exam.
Mt. Yubari	27.5–30.0	28.2	11.3–15.0	13.0	90.1	385
Mt. Apoi	30.0–33.7	32.0	12.5–16.3	13.3	84.8	176
Mt. Tottabetsu	28.8–35.0	32.1	13.8–17.5	15.7	64.7	477
Pirikapetan, Tottabetsu R.	27.5–31.3	29.4	12.5–15.0	13.4	96.8	156

* Only mature pollen grains were measured. The morphology and pattern of pollen grains observed in this study matches well with the Ikuse's description (Ikuse, 1956).

Key to the infraspecific taxa

A. Ultimate leaf-lobes lanceolate 1.5–3.0 cm broad; matured fruits 4–6 mm long .... *A. acutiloba* ssp. *acutiloba*
  B. Leaves membranaceous; fruits 5.0–6.5 mm long, 1.2–2.0 mm wide .... v. *acutiloba*
  B. Leaves somewhat thick, its lobes wider; fruits 4.0–6.0 mm long, 2.0–2.5 mm wids. .... v. *iwatensis*

A. Ultimate leaf-lobes wide-linear 3–8 mm broad; fruits 3–5 mm long, 2–2.5 mm wide .... *A. acutiloba* ssp. *leariloba*
  B. Ultimate leaf-lobes ca. 3 mm broad .... f. *leariloba*
  B. Ultimate leaf-lobes more than 10 mm broad.......................... f. *lanceolata*

Angelica acutiloba (Sieb. & Zucc.) Kitagawa in Bot. Mag. Tokyo **51**: 658 (1937).

Liqusticum acutilobum Sieb. & Zucc. in Abh. Akad. Muench. **4** (2): 203 (1845).

Subsp. **acutiloba** var. **acutiloba.**

Japanese name: Tohki. Distribution: c. Honshu.

Var. **iwatensis** (Kitagawa) Hikino in Act. Phytotax. Geobot. **17**: 84 (1958).

Angelica iwatensis Kitagawa in Bot. Mag. Tokyo **51**: 659 (1937).

Japanese name: Iwate-tohki, Miyama-tohki, Nanbu-tohki.

Specimens examined: Prov. Oshima: Eranachi (K. Miyabe & E. Tokubuchi, 1890). Prov. Iburi: Mt. Washibetsu (S. Kawano, 1957). Prov. Ishikari: Sorachigun, Minami-furano-mura, Ikutora (M. Hiroe, 1951), Mt. Ashibetsu (H. Koidzumi, 1915–TI; S, Nishida, 1914; H. Yanagisawa, 1913). Prov. Hidaka: Fuyushima—Horoman (K. Miyabe & K. Hino, 1935), Samani-sando (K. Miyabem 1884), Shoya (E. Tokubuchi, 1892). Distribution: Hokkaido, n. & c. Honshu.

Habitat: Grassy cliffs along the river or sea-shore.

Subsp. **leneariloba** (Koidz.) Kitamura in Act. Phytotax. Geobot. **20**: 195 (1962).

Liqusticum linearilobum Koidz. in Bot. Mag. Tokyo **21**: 31 (1917).

Angelica stenoloba Kitagawa in Bot. Mag. Tokyo **51**: 659 (1937).

Form. **lienariloba.**

Japanese name: Hosoba-tohki.

Specimens examined: Prov. Ishikari: Mt. Yubari (H. Yanagisawa & A. Hamana. 1912; S. Nishida, 1913, 1916; M. Hiroe, 1951; S. Kawano, 1958). Prov. Hidaka: Mt. Pinneshiri (H. Toyokui & T. Igarashi, 1951), Mt. Yoshida (H. Toyokuni & T. Igarashi, 1951; R. Misumi, 1952), Pon-sanushibetsu (H. Toyokuni & T. Igarashi, 1951) Mt. Apoi (K. Kondo, 1912; M. Tsushima, 1924; K. Miyabe & K. Hino, 1935; M. Tatewaki, 1927; S. Kawano, 1958, 1959). Prov. Tokachi: Mt. Tottabetsu (T. Igarashi & S. Watanabe, 1954), Mt. Satsunai (S. Watanabe, 1957). Distribution: s. Hokkaido.

Habitat: Serpentine barrens or cliffs.

Form. **lanceolata** (Tatewaki) Watanabe et Kawano, comb. nov.

Liqusticum linearilobum var. *lanceolatum* Tatewaki in Journ. Sapporo Soc. Agr. & For. **26** (121): 44 (1934).

Angelica stelonoba form. *lanceolata* (Tatewaki) Hara, Enum. Sperm. Jap. **3**: 298 (1954).

A. stenoloba (non Kitagawa): Hiroe et Constance, Umbell. Jap. (1958) exparte.

Japanese name :Tokachi-tohki.

Specimens examined: Prov. Hidaka: Samani (S. Hashimoto, 1892), Samani-enrumu-misaki (M. Tatewaki, 1927), Horomanbetsu (E. Tokubuchi, 1892), Horo-izumi-yama (E. Tokubuchi, 1892), R. Saru, Nukabira (N. Nishimura, 1952), Samani-iwayama (E. Tokubuchi, 1892; K. Miyabe, 1884). Prov. Tokachi: Mt. Petegari (J. Samejima, 1948), R. Tottabetsu (T. Igarashi & S. Watanabe, 1954), Mt. Tottabetsu (Y. Hoshino, 1933), Mt. Satsunai (S. Nishida, 1917), Mt. Satsunai, Pirikapetan (M. Tatewaki, 1927), R. Satsunai (M. Tatewaki, 1927), R. Toyoni (M. Tatewaki, & J. Samejima, 1949), Mt. Tsurugi (S. Watanabe, 1958; 1960), Iwanami-senkyo (S. Watanabe, 1960).

Distribution: Hokkaido.

Habitat: Wet grassy slopes along rivers or cliffs.

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最近，北村四郎博士は植物分類地理，第20巻，30週年記念号誌上にて，従来北海道の蛇紋岩地帯に於ける固有種として知られた，ホソバトウキ (*Angelica stenoloba* Koidz.) を，中北部本州及び北海道にやや広く分布するミヤマトウキ (*A. acutiloba* Kitagawa, cum vars.) の亜種と認められ，新組合せ (*A. acutiloba* subsp. *lineariloba*) を発表された。筆者等はこの数年来，此の植物に興味を持ち，分布，生態，形態及び染色体等について資料を集めて来た。我々が得た結論は計らずも北村博士のものと同じであった。本報で目下我々の手もとにある二，三の資料を発表した。ホソバトウキはその分布，生態及び形態等から見て，北海道及び本州中北部に拡ろがった母型，ミヤマトウキより分化した固有な生態型的亜種と見做される。

References

Darlington, C. D. & Wylie, A. P. 1955. Chromosome atlas of flowering plants. 2nd ed., pp. 519, London. Hara, H. 1954. Enumeratio spermatophytarum japonicarum. **3**. pp. 337, Tokyo. Hiroe, M. & Constance, L. 1958. Umbelliferae of Japan. Univ. Calif. Publ. Bot. **30**: 1–144, f. 1–75. Ikuse, M. 1956. Pollen grains of Japan. pp. 303, Tokyo. Kitagawa, M. 1960. Synoptical review of Umbelliferae from Japan, Korea & Manchuria. Bull. Nat. Sci. Mus, Tokyo **5** (46): 1–35, pl. 4. Kitamura, S. & Murata, G. 1962. New names and new conceptions adopted in our coloured illustrations of herbaceous plants of Japan II. (Choriptalae). Act. Phytotax. Geobot. **20**: 195–208. Löve, A. & Löve, D. 1961. Chromosome numbers of central and northwest European plant species. pp. 581, Opera Botanica, Lund. Ohwi, J. 1953. Flora of Japan (Nippon shokubutsu shi). pp. 1383, pl. 6, Tokyo.